

Protein level and forage digestibility interactions on dairy cow production

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Background

- › Protein supplementation below requirements reduces feed intake and milk yield

Hypothesis

- › Cows are less sensitive to low protein supply if forage digestibility is high

Tested by:

- › 2 levels of digestibility of forage and 2 levels of protein supplementation

Experiment – Facilities

- › Danish Cattle Research Centre
- › Automatic registration with Insentec feed boxes and AMS



Experiment – Animals and plan



- › 48 Danish Holstein cows in mid lactation
- › 4x4 Latin square with four 21-day periods

Experiment – Treatments

› Four treatments:

	High digestibility	Low digestibility
Normal protein	High digestibility – Normal protein	Low digestibility – Normal protein
Low protein	High digestibility – Low protein	Low digestibility – Low protein

› Forage:concentrate ratio 55:45

Rations - Composition

Digestibility	High	High	Low	Low
Protein	Normal	Low	Normal	Low
	(% dry matter)			
Grass silage	24.0	24.0	24.1	23.4
Maize silage	30.3	30.3	30.4	32.2
Soybean meal	1.9		1.9	
Rapeseed meal	8.7	5.2	8.7	5.1
Barley	9.5	12.3	9.5	12.0
Beet pulp	11.3	14.0	11.3	13.7
Concentrate (robot)	12.6	12.4	12.6	12.1
Urea 80%	0.26	0.26		
Minerals etc.	1.5	1.6	1.5	1.5

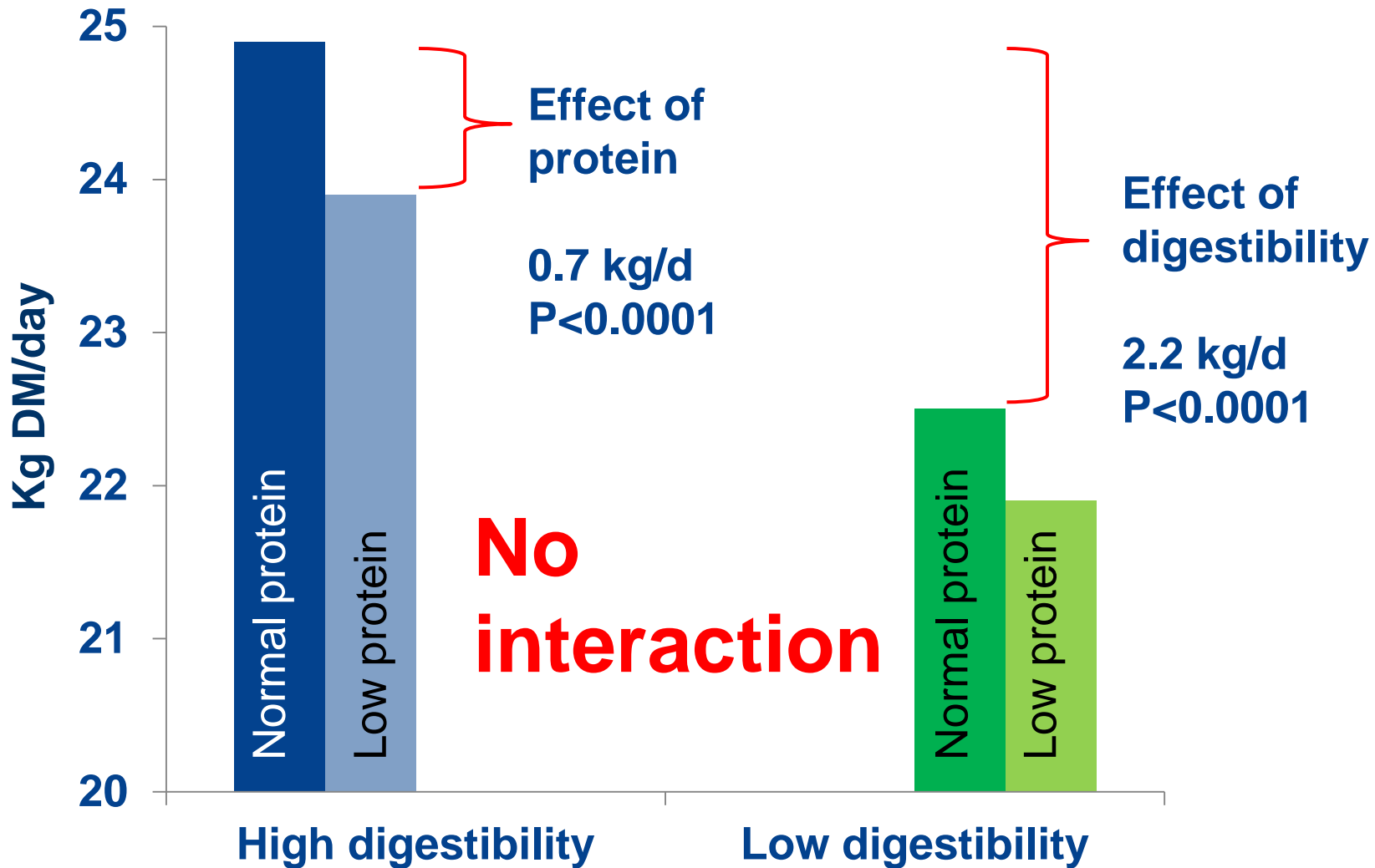
Silages – Nutrient composition

	Grass		Maize	
	High digestible	Low digestible	High digestible	Low digestible
Crude protein, % DM	16.2	14.8	8.1	8.6
Digestibility, % OM	81.0	66.2	77.8	72.0
NDF, % DM	35.8	50.0	37.3	50.9
Starch, % DM	-	-	28.3	13.4
NEL, MJ/kg DM	6.58	5.57	6.65	5.99

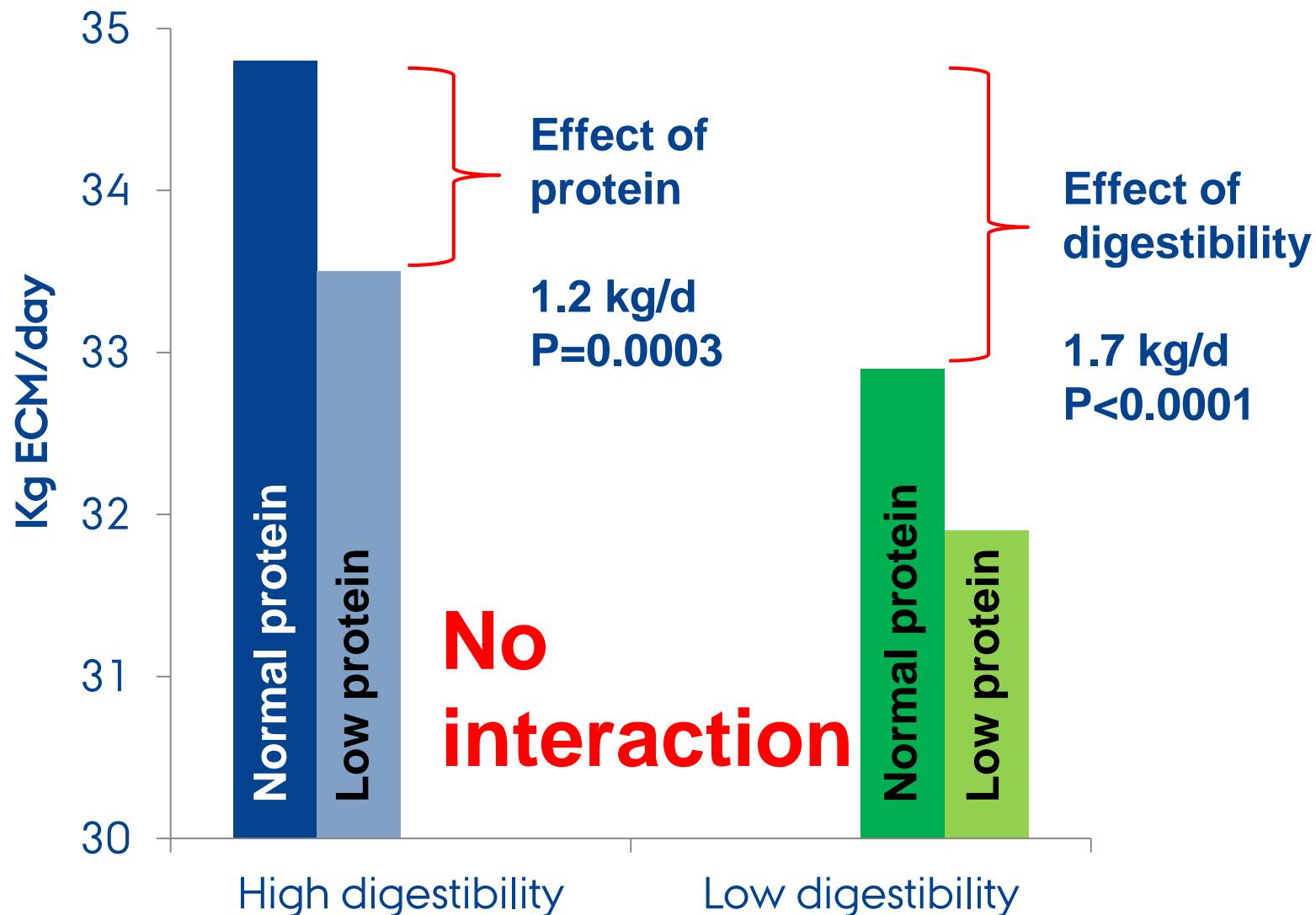
Rations – Nutrient composition

Digestibility	High	High	Low	Low
Protein	Normal	Low	Normal	Low
Crude protein, % DM	15.7	13.9	16.0	14.0
Digestibility, % OM	79.8	79.8	74.7	74.7
NDF, % DM	32.3	32.6	39.9	40.4
NEL ₂₀ MJ/kg DM	6.47	6.46	5.96	5.94

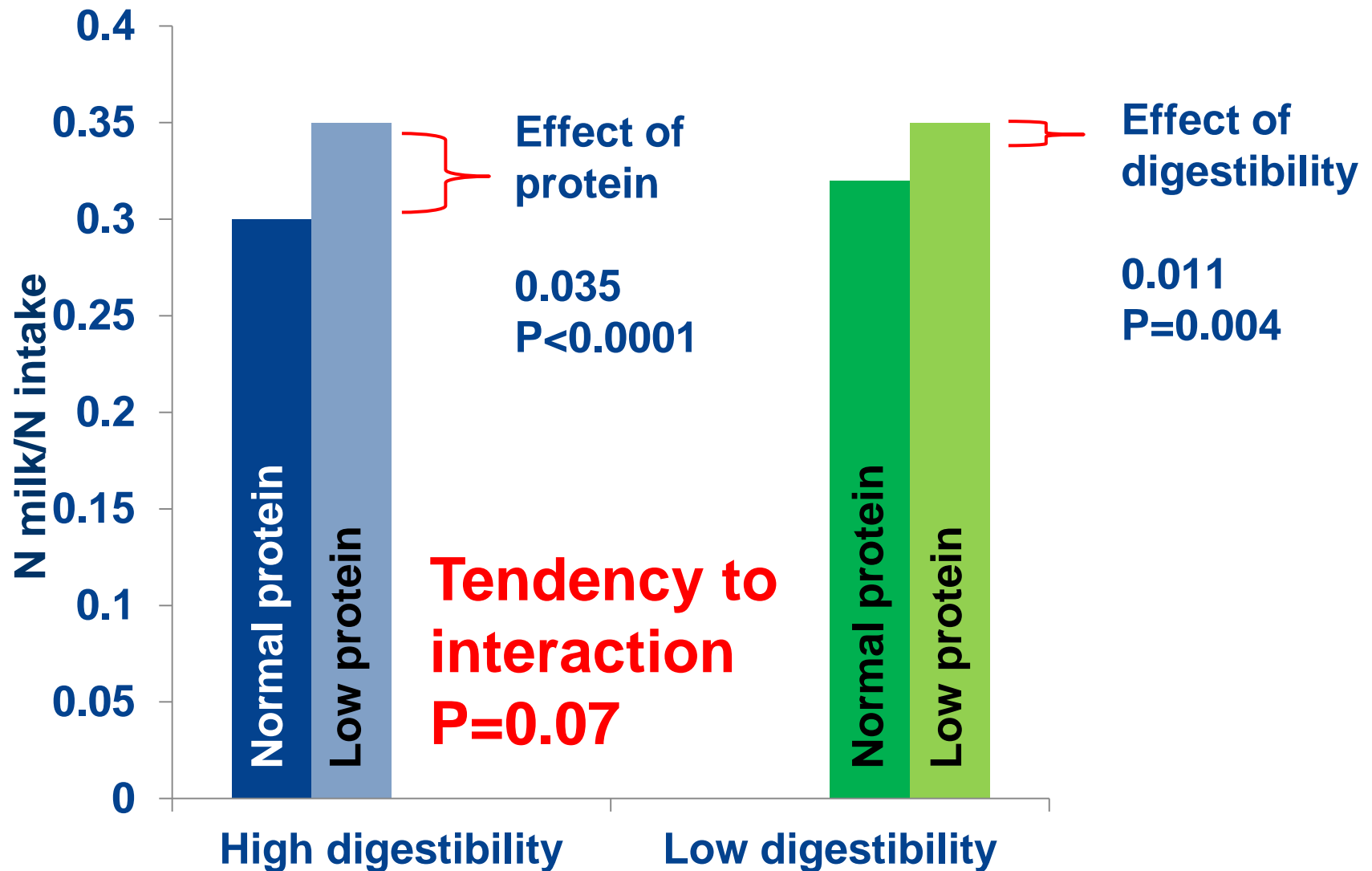
Results – Feed intake



Results – Milk yield



Results – N efficiency



Conclusion

- › **Protein** ↓
 - › **Feed intake** ↓
 - › **Milk production** ↓
 - › **N efficiency** ↑

- › **Digestibility** ↓
 - › **Feed intake** ↓
 - › **Milk production** ↓
 - › **N efficiency** ↑

Conclusion cont.

- › **No interaction**
- › **- same requirement for protein concentration in the ration regardless digestibility of forage**

THANK YOU

FOR THE ATTENTION...

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- › GUDP
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